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10/677,545

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Eric Chao Xu

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ALIX YALE & RISTAS LLP  
750 MAIN STREET  
SUITE 1400  
HARTFORD, CT 06103

EXAMINER

KINNEY, ANNA L

ART UNIT

PAPER NUMBER

1731

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                               |                               |  |
|------------------------------|-------------------------------|-------------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/677,545 | Applicant(s)<br>XU, ERIC CHAO |  |
|                              | Examiner<br>Anna Kinney       | Art Unit<br>1731              |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Terminal Disclaimer***

The terminal disclaimer filed on March 23, 2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of Application 10/677,545 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### ***Response to Arguments***

The Examiner acknowledges applicant's amendments regarding percentages. The Examiner notes that the claims as currently written are redundant in that they recite "by weight per cent" ... "%".

Applicant's arguments filed March 23, 2006 have been fully considered but they are not persuasive.

In response to applicant's argument that the references fail to show certain features of applicant's invention (Remarks, ¶¶ bridging pgs. 15-16), it is noted that the features upon which applicant relies (i.e., higher temperature) are not recited in the rejected claim(s) 21, 35, 36, and 42, and further features (i.e., AP impregnation) are not recited in rejected claim 35. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that Haynes does not disclose any AP pretreatment upstream of the refiner (Remarks, pg. 16 and pg. 17), Haynes was not applied against this feature; however, the Examiner disagrees. Haynes clearly

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considers chemical addition points (Fig. 2, items 261, 263 and col. 12, lines 39-49) upstream of the refiner, and discloses AP as the chemical additive (col. 5, lines 36-53).

In response to applicant's argument that Prusas requires a second pretreatment stage before refining (Remarks, pg. 16), the claims as written do not exclude this step.

In response to applicant's argument that Prusas discloses no suggestion of a post-refining bleaching step (Remarks, pg. 16 and pg. 17), the Examiner disagrees. Prusas clearly discusses further refining, immediately followed by a discussion of additional bleaching (col. 7, lines 9-13). At the time of the invention, it would have been obvious to a person of ordinary skill in the art based on the disclosure of Prusas to bleach pulp after refining.

In response to applicant's argument that Prusas and Haynes are not compatible for combination or integration (Remarks, pg. 17), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In response to applicant's argument that there is no suggestion to combine (i.e., graft) the references (Remarks, pg. 17), the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one

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of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, a motivation to combine was provided in the previous Office Action, pg. 4, 2<sup>nd</sup> full paragraph.

In response to applicant's argument that Prusas does not provide examples including further bleaching downstream of the refiner, examples are not required to show obviousness.

In response to applicant's argument that Haynes is not concerned with optimizing the locations of the AP introduction, the Examiner disagrees. Haynes clearly considers multiple chemical addition locations (col. 12, lines 39-62), including specifically adding chemicals at two locations, one before the primary refiner, and one after (col. 12, lines 40-45). However, since these locations are expressly disclosed, optimization is not required to meet the claims.

In response to applicant's argument that Haynes does not recite a location where the bleaching liquor is introduced to the refining system, the Examiner notes that the claims are only part of the disclosure, which must be considered as a whole. However, the Examiner notes that Haynes' claim 1 defines bleaching liquor as comprising hydrogen peroxide and alkali, and claims 18 and 20 recite providing alkali at the first refiner, and at an interstage section (col. 20, line 58 – col. 21, line 12 and lines 55-63). In view of Haynes' disclosure of locations, discussed above, the Examiner considers Haynes' claimed locations of alkali addition to be equivalent to locations of bleaching liquor addition.

In response to applicant's argument that neither reference provides a nexus to the other, the Examiner disagrees. The nexus is that both references disclose alkaline peroxide mechanical pulping processes in which alkaline peroxide is added to a lignocellulosic material, the lignocellulosic material is refined at temperatures of at least about 80°C, and the lignocellulosic material is further bleached.

In response to applicant's argument that one would not recognize that surprisingly good results can be achieved by combining AP pretreatment upstream of the refiner with AP introduction immediately after the refiner, attorney arguments cannot take the place of evidence in the record (MPEP 716.01(c) II).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-11, 17-29, and 35-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prusas (U.S. 4,486,267) in view of Haynes et al (U.S. Patent 6,743,332).

With respect to claim 1, Prusas discloses an alkaline peroxide mechanical pulping process comprising the steps of: feeding a lignocellulosic material into a first press (col. 5, lines 5-12); pressing the lignocellulosic material (col. 5, lines 13-19); discharging the lignocellulosic material from the first press (col. 5, lines 13-19); impregnating the lignocellulosic material discharged from the first press with a first

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alkaline peroxide pretreatment solution (col. 5, lines 20-44) and maintaining the impregnation for a first reaction time (col. 5, line 65 – col. 6, line 7); feeding the impregnated lignocellulosic material to a refiner having a rotating disc (col. 7, lines 1-4); and refining the impregnated lignocellulosic material to form a primary pulp having a temperature of at least about 80°C (col. 7, lines 1-4 and 8-11).

Prusas does not disclose expressly that the refiner is superatmospheric; adding alkaline peroxide to an intermediate line; and discharging and retaining the pulp in a retention vessel. Although Prusas does not disclose expressly that the refiner has an inlet and a casing, at the time of the invention, it would have been obvious to a person of ordinary skill in the art that a refiner would have these features to introduce pulp to and retain pulp in a refiner, and since these are standard features of refiners known in the art.

Haynes et al discloses delivering a stream of primary pulp from the superatmospheric casing (col. 5, lines 36-41) to an intermediate line (Fig. 2, item 224) while the primary pulp temperature is at least about 80°C; adding an alkaline peroxide intermediate line solution to the stream of primary pulp within the intermediate line (col. 12, lines 49-53) while the primary pulp temperature is at least about 80°C (col. 5, lines 12-20 and 41-45, and Fig. 2, item 262); mixing the intermediate line solution and the stream of primary pulp to form a reaction mixture in the intermediate line (col. 5, lines 41-45); discharging the reaction mixture having a temperature of at least about 80°C into a retention vessel (col. 8, lines 10-14); retaining the reaction mixture in the retention vessel to produce a bleached material (col. 13, line 64 – col. 14, line 8).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a superatmospheric refiner and add an alkaline peroxide solution to an intermediate line, followed by discharge and retention in a vessel, as described by Haynes et al in the pulping process of Prusas et al to obtain the invention as specified in claim 1. The motivation would have been more effective use of hydrogen peroxide, less scaling of process equipment, an increase in pulp yields, and lower pollution levels entering waste water facilities (Haynes, col. 3, lines 55-63).

With respect to claim 17, Prusas and Haynes et al are applied as in the 35 USC 103 rejection of claim 1, above. Prusas further discloses a chemimechanical pulping process (col 2, lines 35-39) and processing the primary pulp further to a secondary pulp (col. 7, lines 9-11). The Examiner considers the chemical bleaching pretreatment solution to be the alkaline peroxide pretreatment solution of claim 1, and the retention tower to be the retention vessel of claim 1.

With respect to claim 18, Prusas and Haynes et al are applied as in the 35 USC 103 rejection of claim 1, above. Prusas discloses pretreatment (col. 5, lines 5-12). Haynes et al discloses a solution inlet port (e.g., chemical addition point, Fig. 2, item 262) and a reaction period (col. 14, lines 1-7).

With respect to claim 21, Prusas and Haynes et al are applied as in the 35 USC 103 rejection of claim 1, above.

With respect to claim 35, Prusas and Haynes et al are applied as in the 35 USC 103 rejection of claim 17, above.



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With respect to claim 36, Prusas and Haynes et al are applied as in the 35 USC 103 rejection of claim 18, above.

With respect to claims 42 and 43, Prusas and Haynes et al are applied as in the 35 USC 103 rejection of claim 36, above. Prusas discloses more than one refining steps afer impregnation and before bleaching (col. 7, lines 9-13).

With respect to claims 2 and 22, Prusas discloses feeding the lignocellulosic material that has been impregnated with the first pretreatment solution for a first reaction time, into a second press (col. 6, lines 8-16); pressing and discharging the lignocellulosic material from the second press (col. 6, lines 8-16); impregnating the lignocellulosic material discharged from the second press with a second alkaline peroxide pretreatment solution and maintaining the second impregnation for a second reaction time (col. 8, lines 33-36, 20-21, and col. 7, lines 40-54).

Prusas does not disclose expressly adding a peroxide refiner solution at the refiner, the pressure of the refiner casing, or a separator.

With respect to claims 3, 19, 23, and 37, Haynes et al discloses adding an alkaline peroxide refiner solution to the lignocellulosic material at the refiner (col. 12, lines 49-53).

With respect to claims 4 and 28, Haynes et al discloses maintaining the superatmospheric casing at a pressure of 68.9 to 276 kPa (i.e., 10-40 psi; col. 11, lines 60-64), which contains one specific point within the claimed range of at least about 240 kPa.

With respect to claim 5, Haynes et al discloses that the step of mixing (Fig. 3, item 336) is immediately followed by introducing the mixture into a separator (Fig. 3, item 338) and the separated pulp is then discharged into said retention vessel (Fig. 3, item 348).

With respect to claims 6, 20, 24, and 38, Haynes et al discloses adding the intermediate line solution immediately after a blow valve (col. 15, lines 8-10).

With respect to claims 7 and 39, Haynes et al discloses adding the intermediate line solution immediately prior to the separator (col. 13, lines 51-64 and col. 15, lines 8-23).

With respect to claim 25, Haynes et al is applied as in the rejections of claims 6, 7, and 21, above. The Examiner notes the addition point immediately prior to the separator in Fig. 2, item 262.

With respect to claim 26, Haynes et al is applied as in the rejections of claims 6, 7, and 21, above. The Examiner notes the addition point at the separator in col. 13, lines 60-64).

With respect to claim 27, Haynes et al is applied as in the rejections of claims 6, 7, and 21, above. The Examiner notes the addition point immediately after the separator in Fig. 3, item 344 (col. 13, lines 57-59).

With respect to claims 40 and 41, Prusas and Haynes are applied as in the rejections to claims 36, 26, and 27, above.

With respect to claim 8, Prusas discloses temperatures in refining in excess of 100°C, which contains one specific point within the claimed range of 90°C and 155°C,

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and a consistency of about 10 to 35%, preferably about 20 to 30%, which contains three specific points within the claimed range of about 20 to about 60% (col. 7, lines 5-13). At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the temperature and consistency of the pulp delivered to an intermediate line would be about the same as the conditions in the refiner absent a step of dilution, dewatering, heating, or cooling.

With respect to claims 9 and 10, Haynes et al discloses that the reaction mixture is retained in the retention vessel at a temperature of about 85°C to about 160°C (col. 5, lines 12-15), which contains one specific point within the claimed range of about 60°C to about 95°C for claim 9 and of about 85°C to about 95°C for claim 10, and a consistency of greater than 3% (col. 9, lines 53-55), which encompasses the claimed range of about 20% to about 40% for claim 9 and about 30% for claim 10.

With respect to claims 11 and 29, Prusas discloses that the impregnation solution contains alkali, peroxide, and stabilizer (col. 5, lines 20-61). Prusas does not disclose the intermediate line solution.

Haynes et al discloses that the intermediate line solution contains alkali, peroxide, and stabilizer (col. 5, lines 41-45)

Haynes does not disclose expressly the temperature of the intermediate line solution. However, Prusas discloses alkali treatment at temperatures ranging from about 20°C to about 80°C (col. 5, lines 62-64), which contains two specific points within the claimed range of less than about 80°C. In the absence of evidence that the intermediate line solution is heated in excess of 80°C, it would have been obvious to a

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person of ordinary skill in the art at the time of the invention that the intermediate line solution would have a temperature comparable to ambient or the alkali treatment temperature disclosed by Prusas.

Claims 12-16 and 30-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prusas and Haynes et al as applied to claims 2 and 22 above, and further in view of Textor (U.S. Patent 3,023,140), Sandstrom et al (U.S. Patent 4,270,976), and Xu (Xu, Eric C., "Chemical Treatment in Mechanical Pulping – Part 3; Pulp Yield and Chemical Pretreatment", 1998 Pulping Conference, TAPPI Proceedings, pp. 391-402).

The transition term "contains" is open-ended and must include at least the amounts of the reagents recited, but does not preclude other reagents or larger amounts of reagent. Therefore, the Examiner has considered the amounts claimed to indicate a lower end of a range of concentrations for each reagent.

With respect to claims 12-16, Prusas discloses that the first impregnation solution contains from about 0.5-4% by weight hydrogen peroxide (col. 5, lines 30-34), which contains the claimed limitation endpoints of 0.5% by weight for claim 14 and 15 and 0.6% by weight for claim 16. Prusas further discloses that chelating agents such as DTPA are preferably used when peroxide is used to prevent decomposition of the peroxide (col. 5, lines 45-54). Prusas discloses expressly concentrations of 0.5% DTPA (col. 5, lines 54-56) and 0.25% DTPA (col. 7, lines 43-45), which suggests a range of 0.25 to 0.5% by weight, which contains the claimed limitation endpoints of 0.3% by weight for claims 12 and 14, 0.5% by weight for claim 13, and could contain the claimed

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limitation of 0.2% by weight for claims 13 (2<sup>nd</sup> impregnation solution) and 15, assuming that the value is truncated.

Haynes et al discloses an acceptable alkalinity to hydrogen peroxide ratio of about 0.25 to about 3 on a weight basis (col. 7, lines 2-4). The alkalinity limitation endpoints of claims 12-16 all fall within this range. Haynes also discloses adding a chelating agent, such as DTPA, in an amount of up to 10% by weight (col. 7, lines 7-18), which encompasses the claimed limitation endpoints of claims 12-16. Haynes further discloses use of sodium silicate up to about 10% by weight (col. 7, lines 32-33), which encompasses the limitation endpoints of claims 12-16. Additionally, Haynes et al discloses a suitable amount of hydrogen peroxide is 0.45% by weight to 9% by weight (10 to about 200 pounds per ton) based on dry pulp (col. 6, lines 62-64), which encompasses the limitation endpoints for claims 12-16, and also discloses a residual peroxide level of greater than 0.7% (col. 10, line 67 to col. 11, line 2), which also encompasses the limitation endpoints for claims 12-16.

Prusas and Haynes et al do not disclose expressly the use of magnesium sulfate or residual alkalinity.

Textor discloses an alkaline peroxide mechanical pulping process (col. 3, line 73 to col. 4, line 1) in which magnesium sulfate is used to stabilize the peroxide bleach liquor (col. 3, lines 8-9). Textor discloses expressly a concentration of .05% magnesium sulfate (col. 3, lines 4-6), which contains one specific point within the claimed range of the 1<sup>st</sup> impregnation solutions of claims 14, 15, and 16, and within the 2<sup>nd</sup> impregnation fluids of claims 15 and 16.

Sandstrom et al discloses an alkaline peroxide mechanical pulping process (col. 1, lines 9-20) in which magnesium sulfate is added to the bleach liquor in an amount of 0.1 to 0.5% of the dry lignocellulosic material (col. 3, lines 4-13), which encompasses the claimed limitation endpoints of the second impregnation solutions of claims 12 and 13, and the intermediate line solutions of claims 12, 13, and 14. The range disclosed by Sandstrom et al also contains two specific points within the claimed ranges of claim 14, 1<sup>st</sup> and 2<sup>nd</sup> impregnation solutions, claim 15, 1<sup>st</sup> and 2<sup>nd</sup> impregnation solutions and intermediate line solution, and claim 16, 1<sup>st</sup> and 2<sup>nd</sup> impregnation solutions.

Xu, provided by applicant, discloses an total alkalinity residual of 0.1% in a 1<sup>st</sup> impregnation stage and 1.3% in a 2<sup>nd</sup> impregnation stage (p. 397, Table II, rows 4 and 7), and a total "total alkalinity" residual of up to 3.1 (p. 398, Table III, row 17), which contains at least one specific point within the claimed ranges of claims 12-15, intermediate line solutions.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to optimize the amount of magnesium sulfate to obtain the most efficient use of the reagent as a stabilizer for the peroxide solution.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use magnesium sulfate as described by Textor and Sandstrom et al and to provide for a residual alkalinity as described by Xu to obtain the invention as specified in claims 12-16.

The motivation would have been that magnesium sulfate stabilizes the peroxide bleach liquor (Textor, col. 3, lines 8-9), and peroxide consumes part of the alkali, leaving

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less alkali to attack the hemicellulose, considering that alkali is commonly known to be responsible for most of the yield losses in an alkaline chemical mechanical pulping of hardwood (Xu, p. 399, lines 1-6).

With respect to claims 30-34, Prusas and Haynes et al are applied as in the rejections to claims 12-16, above.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Kinney whose telephone number is (571) 272-8388. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ALK

  
STEVEN P. GRIFFIN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700